

Work Order ID 137439

September 30, 2015 3:45:04 PM

U/R

137439

Page 1

Item ID: D350-748-103

Revision ID: URF 15-561

Item Name: AS350 / AS355 Stainless Steel Fwd Crosstube

Start Date: 9/30/2015 Start Qty: 1.00 *1*

Required Date: 10/14/2015 Req'd Qty: 1.00 *1*

Reference:

Accept

N9000040100

Setup Start *NS1*

Stop *NS2*

Cust Item ID:

Customer:

Approvals: Process Plan: SA Date: 20150930

Tooling:

Date:

QC: Date: SPC (Y/N):

Date:

Run Start *NR1*

Stop *NR2*

Sequence ID/ Work Center ID	Operation Description	Set Up/ Run Hours	Tool ID	Tool #	Plan Code	Accept Qty	Reject Qty	Reject Number	Insp. Stamp
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Draw Nbr	Revision Nbr								
D350-748-143	A U/R	OK	15/10/1	DWG 6					MUS 15-11-26

100 Document Control 0.00 9-30
DOCUMENT CONTROL

100

DC

Doc.Control: USB or Paperwork

Memo

Photocopy bluefile & type labels per PPPD350-748-103

CHG001

BAS

27

9-30

NOV 30 2015

110 BENDING MACHINE - CROSSTUBES 0.00

110

CNC Bend 1

CNC Delta 100 Bender

Memo

Bend tube as per Dwg D350-748-143 using CNC bender program D350F and Folio FT

UNDER BEND .225" PER SIDE

USE (4) DT9824 SHIM BLOC TO CHECK STRAIGHTNESS

D350-748-103/137439

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137439

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Item ID:	D350-748-103	Accept	*N900040100*	Setup	Start	*NS1*
Revision ID:	URF 15-561					
Item Name:	AS350 / AS355 Stainless Steel Fwd Crosstube				Stop	*NS2*
Start Date:	9/30/2015	Start Qty:	1.00	*1*	Cust Item ID:	
Required Date:	10/14/2015	Req'd Qty:	1.00	*1*	Customer:	
Reference:						

Approvals: **Process Plan:** _____ **Date:** _____ **Tooling:** _____ **Date:** _____ **Run** **Start** ***NR1***
 QC: _____ **Date:** _____ **SPC (Y/N):** _____ **Date:** _____ **Stop** ***NR2***

Sequence ID/ Work Center ID	Operation Description	Set Up/ Run Hours	Tool ID	Tool #	Plan Code	Accept Qty	Reject Qty	Reject Number	Insp. Stamp
120		0.00							

Crosstubes

Crosstubes

Memo

VERIFY CROSS-TUBE DIMENSIONS AS PER DWG

9 15-11-20
9-89

127

QC15- Crosstube Dimensional Check

QC

Quality Control

Memo

MARK CUT LINES

128

Crosstubes

Crosstubes

Memo

CUT TUBE AT HEIGHT ON FAI SHEET

VERF HEIGHT 23.25 BY QC 15 LEVEL INSPECTOR [Signature]

VERFTWIST 1034 BY OC15 LEVEL INSPECTOR *9A*

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Item ID: D350-748-103 Accept ***N900040100*** Setup Start ***NS1***
Revision ID: URF 15-561 Stop ***NS2***
Item Name: AS350 / AS355 Stainless Steel Fwd Crosstube
Start Date: 9/30/2015 Start Qty: 1.00 ***1*** Cust Item ID:
Required Date: 10/14/2015 Req'd Qty: 1.00 ***1*** Customer:
Reference:

Approvals: Process Plan: _____ Date: _____ Tooling: _____ Date: _____ Run Start ***NR1***
QC: _____ Date: _____ SPC (Y/N): _____ Date: _____ Stop ***NR2***

Sequence ID/ Work Center ID	Operation Description	Set Up/ Run Hours	Tool ID	Tool #	Plan Code	Accept Qty	Reject Qty	Reject Number	Insp. Stamp
130	Crosstubes	0.00							
130									
Crosstubes	Memo	0.00							
Crosstubes									
	2- Drill Tube as per Dwg D350-748-143 Using DT8876 A,B & C Drill Jigs, Set-up drill table as per QSI 010								
	3- Deburr								
	4- Engrave Part # and Batch # as per Dwg D350-748-143								
	5- Remove all marks from tube within limits of D350-748-143								
	6- Apply a light coat of LPS3 on the interior of tube Batch: _____								
140	QC5- Inspect part completeness to step on W/O	0.00							
140									
QC	Memo	0.00							
Quality Control	CHECK 10 DEG HOLES WITH DT8876E (EUROCOPTER CLAMP)								

BC 15/11/17

BC 15/11/18

0 15-11-20

DAS
9
9-89

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137439

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Item ID: D350-748-103 Accept ***N900040100*** Setup Start ***NS1***
 Revision ID: URF 15-561 Stop ***NS2***
 Item Name: AS350 / AS355 Stainless Steel Fwd Crosstube
 Start Date: 9/30/2015 Start Qty: 1.00 ***1*** Cust Item ID:
 Required Date: 10/14/2015 Req'd Qty: 1.00 ***1*** Customer:
 Reference:

Approvals: Process Plan: _____ Date: _____ Tooling: _____ Date: _____ Run Start ***NR1***
 QC: _____ Date: _____ SPC (Y/N): _____ Date: _____ Stop ***NR2***

Sequence ID/ Work Center ID	Operation Description	Set Up/ Run Hours	Tool ID	Tool #	Plan Code	Accept Qty	Reject Qty	Reject Number	Insp. Stamp
174	Outsource process - NDT per QSI038 4.1	0.00							
174									
Outsource2	Memo	0.00							
Outsource process - NDT	ISSUE P/O TO ACUREN: <u>30533</u>								
176	Receive & Inspect for Damage & Mat'l Certs	0.00							
176									
Packaging	Memo	0.00							
Packaging									
178	QC5- Inspect part completeness to step on W/O	0.00							
178									
QC	Memo	0.00							
Quality Control									

CZ NOV 23 2015 1
1X 8015-11-23
1 EB
15-11-30

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***RE-CHECK TORCQUE ON CLAMP AFTER PROSEAL HAS CURED
FOR 72HOURS AS PER DWG.***

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Item ID: D350-748-103 Accept ***N900040100*** Setup Start ***NS1***
 Revision ID: URF 15-561 Stop ***NS2***
 Item Name: AS350 / AS355 Stainless Steel Fwd Crosstube
 Start Date: 9/30/2015 Start Qty: 1.00 ***1*** Cust Item ID:
 Required Date: 10/14/2015 Req'd Qty: 1.00 ***1*** Customer:
 Reference:

Approvals: Process Plan: _____ Date: _____ Tooling: _____ Date: _____ Run Start ***NR1***
 QC: _____ Date: _____ SPC (Y/N): _____ Date: _____ Stop ***NR2***

Sequence ID/ Work Center ID	Operation Description	Set Up/ Run Hours	Tool ID	Tool #	Plan Code	Accept Qty	Reject Qty	Reject Number	Insp. Stamp
240	Packaging	0.00							
240									
Packaging	Memo	0.00							
Packaging	Identify and pack for shipping as per PPP D350-748-103								
	Location: _____								
	PPP Rev: <u>F635</u>								
250	QC21- Final Inspection - Work Order Release	0.00							
250									
QC	Memo	0.00							
Quality Control									

IX 28 9-89 NOV 30 2015
27 9-89
ML3 DEC 01 2015
ML3 DEC 01 2015

Picklist Print

September 30, 2015 3:45:09 PM

Page 1

Work Order ID: 137439

137439

Parent Item: D350-748-103

D350-748-103

Parent Item Name: AS350 / AS355 Stainless Steel Fwd Crosstube

Start Date: 9/30/2015

Required Date: 10/14/2015

Start Qty: 1.00

Required Qty: 1.00

Comments: IPP REV:A 15.03.23 NEW ISSUE DD VERF:JLM

Component Item ID/ Item Name	Replacement Item ID	Mfg/ Purch	Bin Item	Primary Location	Last Location	Route Seq ID	Unit of Measure	Qty on Hand	Qty per Kit	Total Qty	Qty Issued	Date Issued	Status
D350-748-143TRN		Manufactured	No				Each	9.0000		1			
D350-748-143TRN									**				
SS Crosstube Turning Detail													

Location	Loc Qty	Loc Code
LG003	9	
129473	1	
135154	1	
135156	1	
135157	1	
135158	1	
135159	1	
135160	1	
135161	1	
135162	1	

① TW 15-11-12

D3502-1

Manufactured No

D3502-1

Support

Each 28.0000

2

DAS
41
9-89

15-11-26

Location	Loc Qty	Loc Code
LG052	28	
130349	28	

2

D5123-7

Manufactured No

D5123-7

Clamp Cushion

Each 54.0000

2

DAS
41
9-89

15-11-26

Location	Loc Qty	Loc Code
LG052	54	
131194	16	
133492	12	
136671	26	

2

Picklist Print

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Work Order ID: 137439

137439

Parent Item: D350-748-103

D350-748-103

Parent Item Name: AS350 / AS355 Stainless Steel Fwd Crosstube

Start Date: 9/30/2015

Required Date: 10/14/2015

Start Qty: 1.00

Required Qty: 1.00

AETC-1032

Purchased

No

Each

20.0000

1

AETC-1032

DAS

41

9-89

15-11-26

Insert

Location

Loc Qty

Loc Code

ST547

20

m133002

20

1

NAS1149C0363R

Purchased

No

Each

1,140.000

1

NAS1149C0363R

DAS

41

9-89

15-11-26

Washer

Location

Loc Qty

Loc Code

FP001

60

114742

60

GA

506

m133077

506

ST260a

494

m133077

494

ST271

80

m130673

20

m132763

60

MS21920-20

Purchased

No

Each

126.0000

2

MS21920-20

DAS

41

9-89

15-11-26

Clamp

Location

Loc Qty

Loc Code

FG

2

122254

2

LG

50

m133134

50

LG050

7

m128650

7

LG056

67

m132675

67

2

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Shop Packet Print

Page 2

Picklist Print

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137439

Parent Item: D350-748-103

D350-748-103

Parent Item Name: AS350 / AS355 Stainless Steel Fwd Crosstube

Start Date: 9/30/2015

Required Date: 10/14/2015

Start Qty: 1.00

Required Qty: 1.00

MS51958-63

Purchased No

Each

42.0000

1

DAS

MS51958-63

**

41

9-89

15-11-26

Screw

Location

Loc Qty

Loc Code

ST273

42

m131886

42

AN4-6A

Purchased No

220

Each

242.0000

16

16

**

133316

DAS

6

9-89

DAS

28

9-89

BOLT

Location

Loc Qty

Loc Code

CA

143

M128403

43

M130851

100

ST345

99

M128403

8

M131153

91

BAS
27
9-89

D3500-1

Manufactured No

220

Each

11.0000

4

4

**

138663

DAS
28
9-89

D3500-1

Saddle

Location

Loc Qty

Loc Code

ST406

11

129373

10

131168

1

BAS
27
9-89

NOV-26-2015

Picklist Print

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Work Order ID: 137439

137439

Parent Item: D350-748-103

D350-748-103

Parent Item Name: AS350 / AS355 Stainless Steel Fwd Crosstube

Start Date: 9/30/2015

Required Date: 10/14/2015

Start Qty: 1.00

Required Qty: 1.00

AN5-32A

Purchased

No

220

Each

89.0000

4

4

AN5-32A

Bolt

DAS
6
9-89

DAS
28
9-89

DAS
27
9-89

Location

Loc Qty

Loc Code

ST299A

30

m132857

30

ST336

52

m132536

52

ST337

7

m131139

7

NAS1149D0463J

Purchased

No

220

Each

2,505.000

32

32

NAS1149D0463J

WASHER

133284

DAS
6
9-89

DAS
28
9-89

DAS
27
9-89

Location

Loc Qty

Loc Code

GA

41

M129390

41

ST269

2464

M129682

86

M130799

371

M132317

125

M132677

888

M133077

994

NOV 26 2015

Picklist Print

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Work Order ID: 137439

137439

Parent Item: D350-748-103

D350-748-103

Parent Item Name: AS350 / AS355 Stainless Steel Fwd Crosstube

Start Date: 9/30/2015

Required Date: 10/14/2015

Start Qty: 1.00

Required Qty: 1.00

D3501-1

Manufactured No

220

Each

327.0000

16

16

D3501-1

Bushing

DAS

6

9-89

DAS

28

9-89

Location

Loc Qty

Loc Code

ST039

176

130742

14

135919

162

ST046

1

125925

1

ST051A

150

135918

150

16

BAS
27
9-89

AN4-41A

Purchased

No

220

Each

187.0000

8

8

AN4-41A

Bolt

DAS

6

9-89

DAS
28
9-89

Location

Loc Qty

Loc Code

ST312A

138

m130726

8

m132189

130

ST342

49

m130716

49

8

BAS
27
9-89

MS21042L5

Purchased

No

220

Each

391.0000

4

4

MS21042L5

Nut

133363

DAS

6

9-89

DAS

28

9-89

Location

Loc Qty

Loc Code

GA

146

m127813

146

ST260a

197

m132677

197

ST305

48

m127813

19

m131340

21

m132123

8

BAS
27
9-89

NOV 26 2015

Picklist Print

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Work Order ID: 137439

137439

Parent Item: D350-748-103

D350-748-103

Parent Item Name: AS350 / AS355 Stainless Steel Fwd Crosstube

Start Date: 9/30/2015

Required Date: 10/14/2015

Start Qty: 1.00

Required Qty: 1.00

MS21042L4

Purchased

No

220

Each

1,426.000

24

24

MS21042L 4

Locknut

**** 133363**

DAS

6

9-89

DAS

28

9-89

NOV 26 2015

BAS
27
9-89

Location

Loc Qty

Loc Code

FP001

2

m124231

2

GA

112

m127813

112

ST260a

170

m130799

56

m131803

6

m132262

108

ST305

1142

m128300

8

m130388

7

m130922

97

m131618

12

m132123

56

m132382

962

Picklist Print

September 30, 2015 3:45:10 PM

Work Order ID: 137439

137439

Parent Item: D350-748-103

D350-748-103

Parent Item Name: AS350 / AS355 Stainless Steel Fwd Crosstube

Start Date: 9/30/2015

Required Date: 10/14/2015

Start Qty: 1.00

Required Qty: 1.00

NAS1149D0563J

Purchased

No

220

Each

964.0000

8

8

NAS1149D0563.J

DAS

DAS

6

28

Washer

9-89

9-89

NOV 26 2015

DAS
27
9-89

Location

Loc Qty

Loc Code

GA

53

m125807

53

ST260a

428

m130799

63

m132035

55

m132256

10

m133134

300

ST269

464

m128257

156

m132677

308

ST271

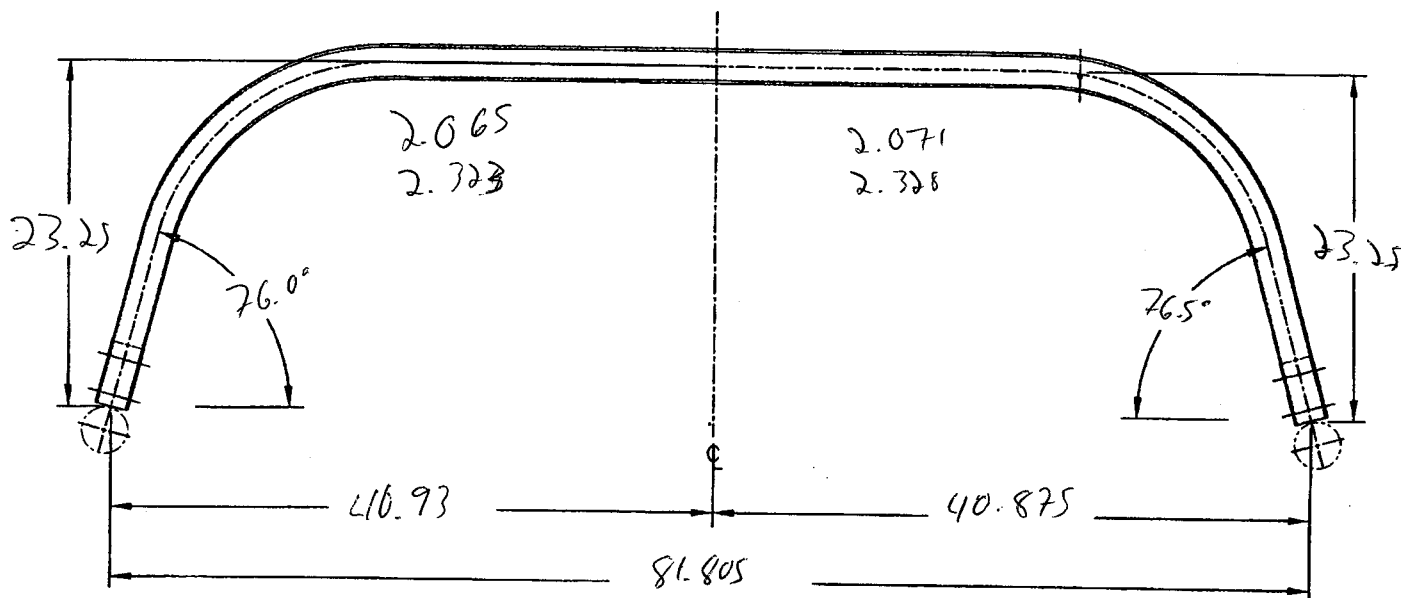
19

m131026

19

DART AEROSPACE LTD		Work Order:	137439
Description: Crosstube High Fwd, SS (AS350/355)		Part Number:	D350-748-103
Inspection Dwg: D350-748-143	Rev: A	Page 1 of 1	

Required Dimension	Min	Max
Height	23.00	23.50
1/2 Span	40.77	41.03
Angle	75	77
Total Span	81.55	82.05
Bending Passes	7	—
Crushing	--	8%
Twist	--	0.38



	Side A	Side B
Bending Passes	31	31
Crushing	2.6 5.9%	5.8%
Comments		

QC15 Inspection	DAS
Date	33
	9-88 15-11-16

Rev	Date	Change	Revised by	Approved
A	15.09.09	New Issue	KJ	AA

Item	Qty -143	Part Number	Description
	X	D350-748-143	CROSSTUBE ASSEMBLY (AS 350/355 HI FWD)
1	1	D8021-125	CROSSTUBE
2	2	D3502-1	SUPPORT
3	2	D5123-7	CLAMP CUSHION
4	1	AETC-1032	INSERT
5	2	MS21920-20 OR MS21920-21/-22	CLAMP (PER DART SPEC. M-MS21920-20/-21/-22)
6	1	NAS1149C0363R	WASHER (OR AN960C10)
7	1	NAS1635-3-8	SCREW (OR MS51958-63)
8	A/R	PROSEAL 890 B-2	SEALANT, AMS-S-8802 CLASS B-2

GENERAL NOTES:

- 1) MATERIAL: MANUFACTURED FROM D8021-125 (17-4PH)
FINISHED LENGTH AFTER TURNING = 112.270±0.06 (AFTER BENDING/TRIMMING = 110.27 REF)
- 2) FINISH: PRIME INSIDE AND OUTSIDE PER DART QSI 005 4.2
PAINT OUTSIDE PER DART QSI 005 4.2
- 3) TOLERANCE: PER DART QSI 018 UNLESS OTHERWISE NOTED.
WALL THICKNESS ECCENTRICITY PER DART QSI 038 7.2
MIN. ALLOWABLE WALL IS -0.020 FROM NOMINAL
- 4) UNITS: INCHES UNLESS OTHERWISE NOTED.
- 5) BREAK SHARP EDGES: 0.005 TO 0.010 MAX.
- 6) IDENTIFICATION: DART PART NUMBER "D350-748-143" AND BATCH NUMBER ON INSIDE OF CUFF
PER DART QSI 044 6.4 (VIBRATING STYLUS)
- 7) WEIGHT: 30.45 lbs
- 8) PART IS SYMMETRIC ABOUT CENTERLINE, EXCEPT FOR Ø0.280 HOLE.
- 9) EXTREME CARE MUST BE TAKEN TO PROTECT THE OUTSIDE SURFACE OF THE TUBE. THE OUTSIDE SURFACE MUST BE SMOOTH AND FREE FROM SURFACE DEFECTS SUCH AS SCRATCHES, NICKS, OR DENTS. DEFECTS UP TO 0.005" MAY BE BLENDED OUT LONGITUDINALLY. CIRCUMFERENTIAL GRIND MARKS ARE UNACCEPTABLE. WHEN DRILLING HOLES EXTREME CARE MUST BE TAKEN AND CAREFUL DEBURRING PERFORMED TO ENSURE A CLEAN HOLE WITH NO CRACKING/CHIPPING/GROOVES.

TURNING

- 10) BLEND OUT ALL EDGES FROM MACHINING LONGITUDINALLY, TRANSITION SHOULD BE SMOOTH. NOTE: ALL HOLES ARE DRILLED AFTER BENDING.

BENDING

- 11) BEND PROGRESSIVELY WITH A MINIMUM OF 7 PASSES PER SIDE. MAXIMUM TUBE FLATTENING DUE TO BENDING IS 6% BASED ON O.D. ON TOP HALF OF BEND, AND 8% ON BOTTOM HALF OF BEND.
- 12) MAX AMPLITUDE OF RIBBLING ALONG BENT PORTION OF THE TUBE IS 0.030 (ZN A1-3)
- 13) MAX TWIST: WITH XTUBE LAYED FLAT ON SURFACE, THE DIFFERENCE BETWEEN CUFF HEIGHTS FROM THE SURFACE MAY BE NO LARGER THAN 0.38 (ZN C1-3).

ASSEMBLY

- 14) TO INSTALL D3502-1 SUPPORT: ABRASE MATING SURFACE OF SUPPORT AND CROSSTUBE WITH 180-GRIT SANDPAPER AND REMOVE RESIDUE WITH MEK (OR EQUIVALENT), APPLY A 0.02" TO 0.05" THICK LAYER OF PROSEAL 890 CLASS B-2 (OR AMS-S-8802 CLASS B-2) SEALANT TO MATING SURFACE OF SUPPORT.
- 15) TORQUE CLAMPS 80 TO 80 IN-LB. ENSURE AT LEAST 1.5 THREADS SHOWING IN SAFETY AND THAT NUT HAS NOT BOTTOMED-OUT AFTER TORQUING. PRIOR TO PACKAGING, RE-CHECK TORQUE ON CLAMPS AFTER PROSEAL 890 SEALANT HAS CURED FOR 72 HOURS.

UNDER REVIEW

15/4/24

URF 15.561

2 0 1 5 0 9 3 0

5H 137439.

RELEASED

2015 MAR 18

Q EN 15-547

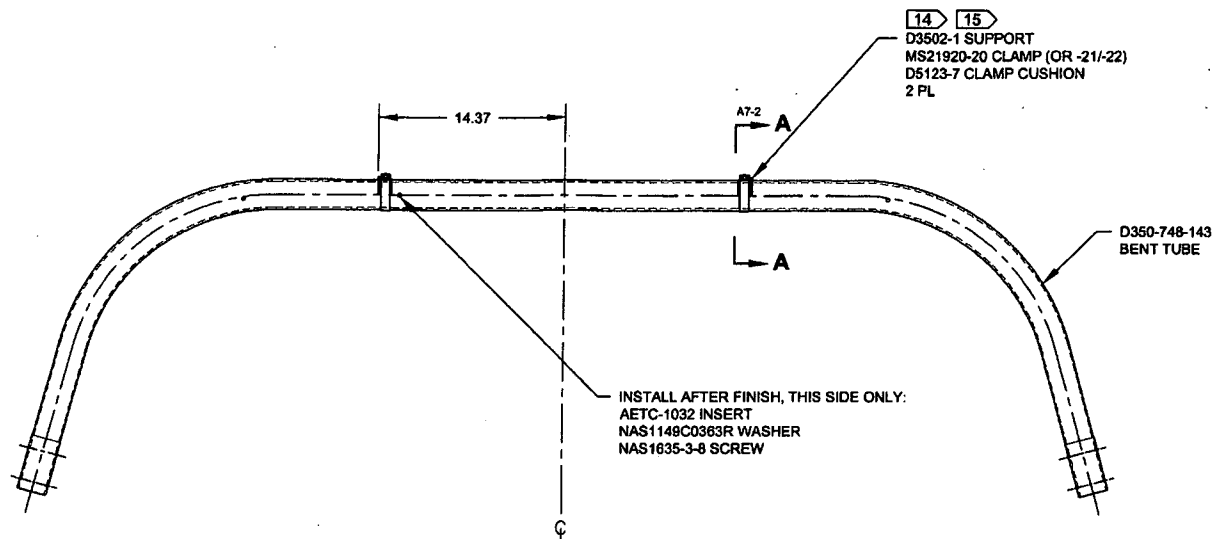
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REV.	DESCRIPTION	BY	DATE
DESIGN			
DRAWN			
CHECKED			
MFG. APPR.			
APPROVED			
DE APPR.			
DATE	15.01.21		

DART AEROSPACE LTD
HAWKESSBURY, ONTARIO, CANADA

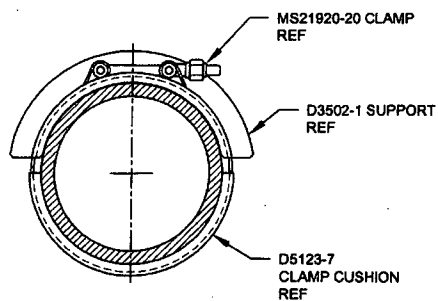
DRAWING NO. D350-748-143
TITLE CROSSTUBE (AS 350/355 HI FWD)

REV. A
SHEET 1 OF 4
SCALE NTS

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**D350-748-143
ASSEMBLY DETAIL**



SECTION A-A D4-2
SCALE 6X

UNDER REVIEW

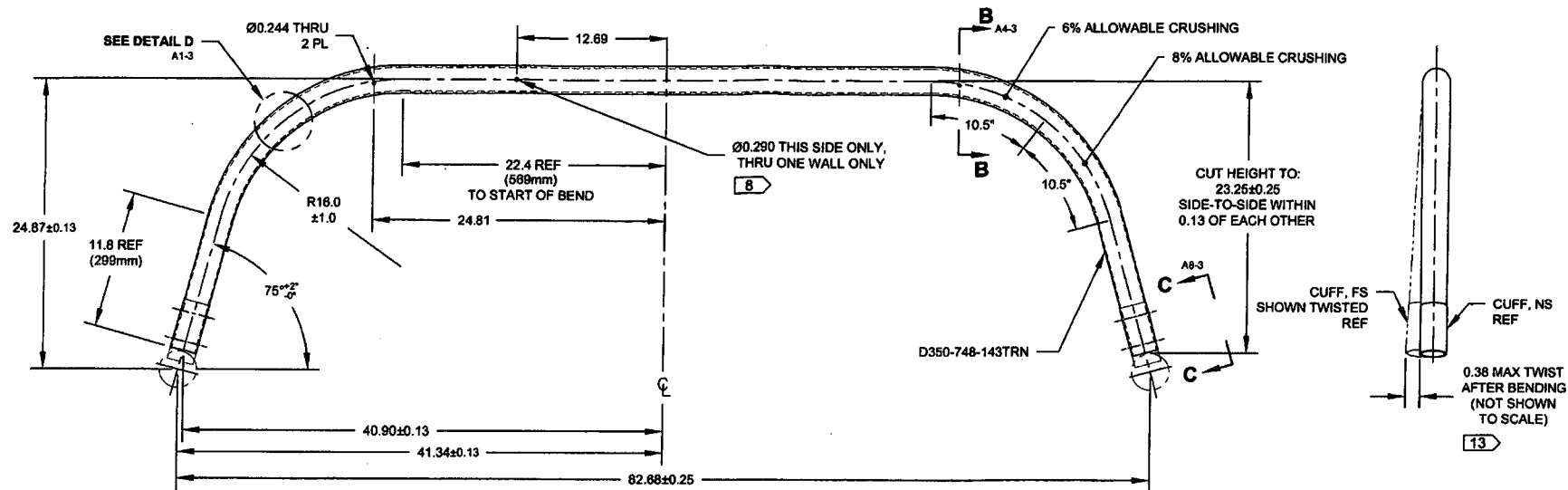
4/15/23

RELEASED

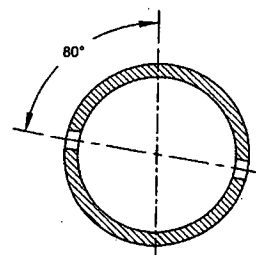
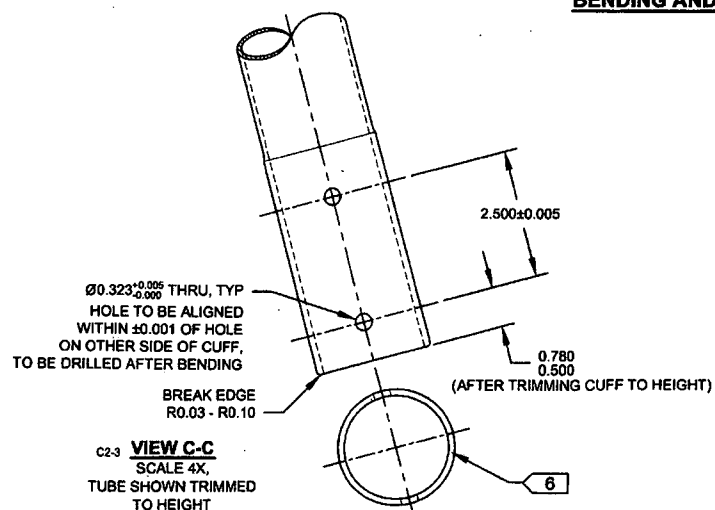
2015 MAR 18

47 ECW-15-547

DESIGN	47	DART AEROSPACE LTD	
DRAWN	47	HAWKESSBURY, ONTARIO, CANADA	
CHECKED	A.P.	DRAWING NO.	REV. A
MFG. APPR.		D350-748-143	SHEET 2 OF 4
APPROVED		TITLE	SCALE
DE APPR.		CROSSTUBE (AS 350/355 HI FWD)	NTS
DATE	15.01.21	COPYRIGHT © 2015 BY DART AEROSPACE LTD	
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D350-748-143
BENDING AND DRILLING DETAIL 11



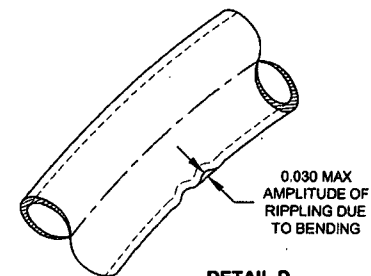
SECTION B-B D3-3
SCALE 6X

RELEASED

2015 MAR 18

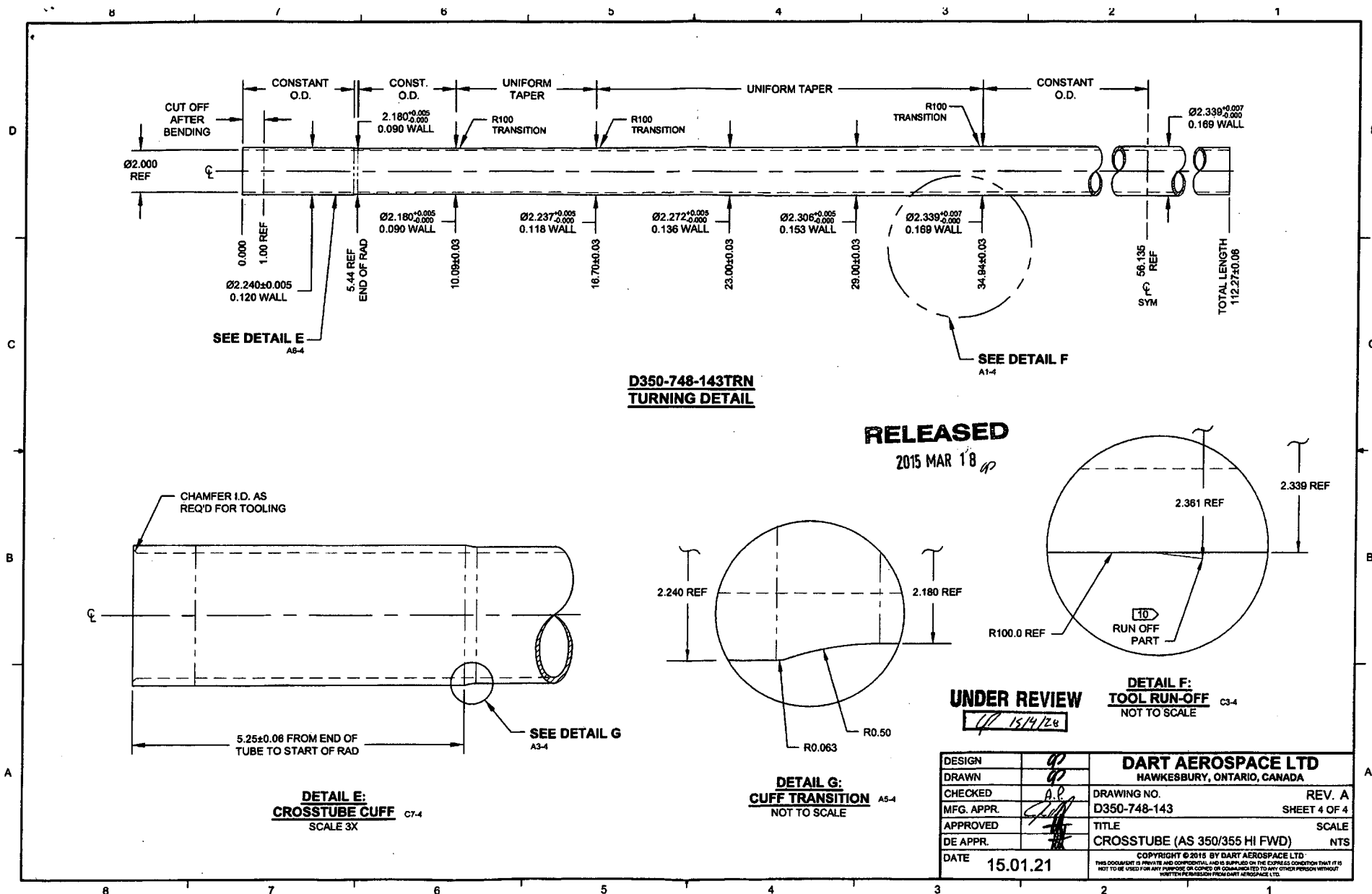
UNDER REVIEW

15/14/28



DETAIL D D7-3
SCALE 4X
RIPPLING EXAGGERATED

DESIGN		DART AEROSPACE LTD	
DRAWN		HAWKESBURY, ONTARIO, CANADA	
CHECKED	A.P.	DESIGN NO.	REV. A
MFG. APPR.		D350-748-143	SHEET 3 OF 4
APPROVED		TITLE	SCALE
DE APPR.		CROSSTUBE (AS 350/355 HI FWD)	NTS
DATE	15.01.21	COPYRIGHT © 2015 BY DART AEROSPACE LTD THIS DOCUMENT IS PRIVATE AND CONFIDENTIAL AND IS SUPPLIED ON THE EXPRESS CONDITION THAT IT IS NOT TO BE USED FOR ANY PURPOSE OR COPIED OR COMMUNICATED TO ANY OTHER PERSON WITHOUT WRITTEN PERMISSION FROM DART AEROSPACE LTD.	



DQA: _____ Date: _____

WORK ORDER NON-CONFORMANCE / UPDATEWork Order update only ☐

QA Closed: _____ Date: _____

Work Order: _____ Part No. _____ NCR No. _____	DISPOSITION		AGAINST DEPARTMENT/PROCESS				
	Rework ☒		Skid-tube ☐	Cross tube ☐	Water Jet ☐	Engineering ☐	
	Scrap ☐		Machining ☐	Small Fab ☐	Prod. Eng. Coord. ☐	Quality ☐	
	Use-as-is ☐		Thermoforming ☐	Finishing ☐	Rec/Store/Packaging ☐	Other ☐	
	Suspected Unapproved ☐		Large Fab ☐	Composite ☐	Supplier ☐		

Date: 15/10/1	Step #: 180	QTY Effective: 1	MRB (QSI042) Approval DAS 12 9-89 15/10/1
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Description Work Order Deviation	Disposition	DAS Completed By 41 15-11-24
Prep surface per QSI 005 4.1.4	Axclite 132058 B/N: 132520 Axclite Metablok Z305 B/N: 132474	Lead hand / Supervisor Approval Verification
		QC / QA Coordinator Approval

Root Cause			FAULT CATEGORY		
Environment ☐	No Re-verification ☐	Pressure/Forced ☐	Temperature/Cure ☐	Power Loss/Surge ☐	Positioned Wrong ☐
Design ☐	Operator ☐	Bending ☐	Set-up ☐	Folio/Program ☐	Outside Dimensions ☐
Doc/Data ☐	Offset/Setup ☐	Centre Not Concentric ☐	BOM/Route ☐	Grain ☐	Over/Under tolerance ☐
Equip/Tooling ☐	Supplier ☐	Cracks ☐	Broken/Damage/Defect ☐	Weld ☐	Part Incorrect ☐
Handling/Pre ☐	Training ☐	Crimp/Kink/Ripple/Wave ☐	Inspection Incomplete/Unqualified ☐	Wrong Stock Pulled ☐	Part Lost/Missing ☐
Material ☐	Use for Testing ☐	Cuffs ☐	Contamination ☐	Out of Sequence ☐	Part Moved ☐
Internal Transport ☐	Poor Information ☐	Crushing ☐	Countersink ☐	Off-set ☐	Drawing ☐
Tribal Knowledge ☐	Rushing ☐	Heat Treat ☐	Cut Too Short ☐	Mislabeled ☐	Finish ☐
LOA ☐	Product Improvement ☐	Wave/Twist in Tube ☐	Instructions Incomplete/Unclear ☐	Fit/Function ☐	Misread ☐
Substation ☐	Process Improvement ☐	Marks/Chatter ☐	Drill Holes ☐	Misaligned/off center ☐	Turning Sequence ☐
Past Expiry Date ☐	Manufacturing Process ☐				
Misidentified ☐	Past Due ☐	OTHER: _____			



Dart Aerospace Ltd.
1270 Aberdeen Street
Hawkesbury, ON K6A 1K7
Tel: 613 632 9577
Fax: 613 632 1053

PURCHASE ORDER

Purchase Order ID **PO30533**

Purchase Order Date 11/20/2015

PO Print Date 11/23/2015

Page Number 3 of 6

Order From :
SKYSERVICE
6120 MIDFIELD ROAD
MISSISSAUGA, ONTARIO L5P 1B1
CANADA

VC-SKY001

Ship To : DART AEROSPACE LTD
1270 ABERDEEN
HAWKESBURY, ON K6A 1K7
CANADA

Contact Name
Vendor Phone 905-678-5636

Ship To Contact
Ship To Phone
Ship Via: Delivered
Ship Acct:

Buyer Chantal Lavoie
Customer POID
Customer Tax # 10127-2607
Terms Net 30
Currency CAD
FOB FCA - (Free Carrier)

Line Total: \$115.00

6	137438	D350-748-103 CROSSTUBE	11/23/2015	1.00	\$115.00	\$115.00
---	--------	---------------------------	------------	------	----------	----------

Yes
11/23/2015

SAME AS ABOVE

Line Total: \$115.00

7	137439	D350-748-103 CROSSTUBE	11/23/2015	1.00	\$115.00	\$115.00
---	--------	---------------------------	------------	------	----------	----------

Yes
11/23/2015

SAME AS ABOVE

SP15-11-23

Line Total: \$115.00

8	138647	D350-748-203 CROSSTUBE	11/23/2015	1.00	\$115.00	\$115.00
---	--------	---------------------------	------------	------	----------	----------

Yes
11/23/2015

SAME AS ABOVE

Note:

11/23/2015

**skyservice****Work Order Traveler**

Sky Service F.B.O. Inc.

DOT APP 53-89 / EASA 145.7142 / BD. AMO 385

WO #: MWO26474	Customer: Dart Aerospace Ltd.	Dept: NDT YUL	Reference: 30533
Descr:	PN:	S/N:	Qty: 1
Make:	Model:	Reg:	A/C S/N:
TSN:	CSN:	TSO:	
Task: UNSCHEDULED			Sequence: 1

Work Required:

CARRY OUT NDT ON 13 CROSSTUBES AS PER PO30533

2 AFT CROSSTUBES, ITEM ID# D212-664-207 , WORK ORDERS ID# 136710, 138508

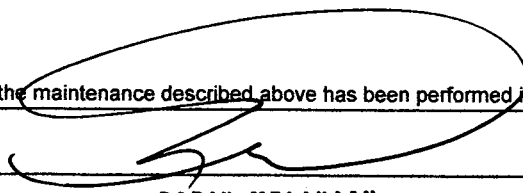
6 STAINLESS STEEL AFT CROSSTUBES, ITEM ID# D350-748-203 , WORK ORDERS ID# 138647, 138648, 138649, 138650, 138661, 138662

5 STAINLESS STEEL FWD CROSSTUBES, ITEM ID# D350-748-103 , WORK ORDERS ID# 137437, 137438, 138714, 137436, 137439

SP1511-23

Action Taken:						Date:	Initial/Stamp:
LPI C/O IAW ASTM E-1417M13 NO CRACK FOUND PEN. ZL-56, MPO13600, UV M-20141, CLEANER SKC-S MPO13923 , DEV. MPO11715						NOV 20 2015	 
Description	Location	P/N	Qty	Batch	S/N Off	S/N On	

I certified that the maintenance described above has been performed in accordance with the applicable standard of airworthiness.

Signature: 	ACA/SCA Stamp 	Date: NOV 20 2015
Name: RAFIK MELIKIAN		

QA Closed:

Date:

WORK ORDER NON-CONFORMANCE / UPDATE

Work Order: 137439Part No. D350-748-103

NCR No.

DISPOSITION

Rework ☒
 Scrap ☐
 Use-as-is ☐
 Suspected Unapproved ☐

Work Order update only ☐

AGAINST DEPARTMENT/PROCESS

Skid-tube ☐ Cross tube ☐ Water Jet ☐ Engineering ☐
 Machining ☐ Small Fab ☐ Prod. Eng. Coord. ☐ Quality ☐
 Thermoforming ☐ Finishing ☐ Rec/Store/Packaging ☐ Other ☐
 Large Fab ☐ Composite ☐ Supplier ☐

Date: 15.11.26

Step #:

QTY Effective:

Description Work Order Deviation

AETK-1032 INSERTS BREAKING ON INSTALLATION

Disposition

BASED ON ENG TESTING IT WAS
 FOUND THAT INSTALLATION IS MORE
 RELIABLE IF INSTALLATION PRESSURE (AIR
 HOSE) IS REGULATED TO 50 PSI
 AND INSTALLATION HOLE IS REAMED
 TO Ø 0.290 IN ACCORDANCE MANUFACTURERS
 INSTRUCTIONS. OPEN PAR TO ADD
 NOTE TO STEP # 200 WHICH READS
 "LIMIT AIR PRESSURE TO 50PSI WHEN
 INSTALLING AETK-1032 INSERT AND
 ONLY EXPAND INSERT ONCE"

MRB (QSI042) Approval

Al
15.11.26

Completed By

Lead hand / Supervisor
Approval VerificationQC / QA Coordinator
Approval

Root Cause

Environment ☐ No Re-verification ☐
 Design ☐ Operator ☐
 Doc/Data ☐ Offset/Setup ☐
 Equip/Tooling ☐ Supplier ☐
 Handling/Pre ☐ Training ☐
 Material ☐ Use for Testing ☐
 Internal Transport ☐ Poor Information ☐
 Tribal Knowledge ☐ Rushing ☐
 LOA ☐ Product Improvement ☐
 Substation ☐ Process Improvement ☐
 Past Expiry Date ☐ Manufacturing Process ☐
 Misidentified ☐ Past Due ☐

Pressure/Forced ☐
 Bending ☐
 Centre Not Concentric ☐
 Cracks ☐
 Crimp/Kink/Ripple/Wave ☐
 Cuffs ☐
 Crushing ☐
 Heat Treat ☐
 Wave/Twist in Tube ☐
 Marks/Chatter ☐

FAULT CATEGORY

Temperature/Cure ☐
 Set-up ☐
 BOM/Route ☐
 Broken/Damage/Defect ☐
 Inspection Incomplete/Unqualified ☐
 Contamination ☐
 Countersink ☐
 Cut Too Short ☐
 Instructions Incomplete/Unclear ☐
 Drill Holes ☐

Power Loss/Surge ☐
 Folio/Program ☐
 Grain ☐
 Weld ☐
 Wrong Stock Pulled ☐
 Out of Sequence ☐
 Off-set ☐
 Mislabeled ☐
 Fit/Function ☐
 Misaligned/off center ☐

Positioned Wrong ☐
 Outside Dimensions ☐
 Over/Under tolerance ☐
 Part Incorrect ☐
 Part Lost/Missing ☐
 Part Moved ☐
 Drawing ☐
 Finish ☐
 Misread ☐
 Turning Sequence ☐

OTHER:

Work Order ID 137439

September 30, 2015 3:45:04 PM

U/R

137439

Item ID: D350-748-103

Revision ID: URF 15-561

Item Name: AS350 / AS355 Stainless Steel Fwd Crosstube

Start Date: 9/30/2015 Start Qty: 1.00

Required Date: 10/14/2015 Req'd Qty: 1.00

Reference:

Approvals:

Process Plan: SA

Date:

20150930

Tooling:

Date:

QC:

Date:

SPC (Y/N):

Date:

Run

Start

NR1

Stop

NR2

Sequence ID/ Work Center ID	Operation Description	Set Up/ Run Hours	Tool ID	Tool #	Plan Code	Accept Qty	Reject Qty	Reject Number	Insp. Stamp
--------------------------------	--------------------------	----------------------	---------	--------	--------------	---------------	---------------	------------------	----------------

Draw Nbr	Revision Nbr								
D350-748-143	A U/R	OK	<u>CP</u>	<u>15/10/1</u>					

100	Document Control	0.00							
-----	------------------	------	--	--	--	--	--	--	--

100

DC	Memo	0.00							
Doc.Control -USB or Paperwork	Photocopy bluefile & type labels per PPPD350-748-103		CHG001						

ML5 15-11-26

110		0.00							
-----	--	------	--	--	--	--	--	--	--

110

CNC Bend 1	BENDING MACHINE - CROSSTUBES	0.00							
CNC Delta 100 Bender	Memo								
	Bend tube as per Dwg D350-748-143 using CNC bender program D350F and Folio FT								

BC 15/11/12

****UNDER BEND .225" PER SIDE****

****USE (4) DT9824 SHIM BLOC TO CHECK STRAIGHTNESS****

32.6 WEIGHT AND BALANCE

The following weight and balance information is for Dart crosstube installations only. This data should be similar to the existing installation. Differences from the parts removed are the responsibility of the installer.

DART CROSSTUBE	FWD/AFT	WEIGHT	STA	MOMENT
D350-748-101 D350-748-103	Fwd	35.2 lb (16.0 kg)	106.3 in (2.70 m)	3742 lb-in (43.2 kg-m)
D350-748-201 D350-748-203	Aft	34.7 lb (15.7 kg)	162.4 in (4.12 m)	5635 lb-in (64.7 kg-m)

32.7 PARTS LIST

Qty -101	Qty -103	Qty -201	Qty -203	Part Number	Description
X				D350-748-101	CROSSTUBE INSTALLATION, AS 350/355 HIGH FWD
	X			D350-748-103	CROSSTUBE INSTALLATION, AS 350/355 HIGH FWD (SS)
		X		D350-748-201	CROSSTUBE INSTALLATION, AS 350/355 HIGH AFT
			X	D350-748-203	CROSSTUBE INSTALLATION, AS 350/355 HIGH AFT (SS)
1				D350-748-141	CROSSTUBE ASSEMBLY, AS 350/355 HIGH FWD
	1			D350-748-143	CROSSTUBE ASSEMBLY, AS 350/355 HIGH FWD (SS)
		1		D350-748-241	CROSSTUBE ASSEMBLY, AS 350/355 HIGH AFT
			1	D350-748-243	CROSSTUBE ASSEMBLY, AS 350/355 HIGH AFT (SS)
*2	*2	*2	*2	D3502-1	SUPPORT
*2	*2	*2	*2	D5123-7	CLAMP CUSHION
*1		*1		AELS-1032-225	INSERT
	*1		*1	AETC-1032	INSERT
*2	*2	*2	*2	MS21920-22	CLAMP (OR MS21920-20/-21)
*1		*1		MS27039-1-10	SCREW
	*1		*1	NAS1685-3-8	SCREW (OR MS51958-63)
*1		*1		NAS1149D0363J	WASHER (OR AN960JD10)
	*1		*1	NAS1149C0363R	WASHER (OR AN960C10)
4	4	4	4	D3500-1	SADDLE
16	16	16	16	D3501-1	BUSHING
16	16	16	16	AN4-6A	BOLT
8	8	8	8	AN4-41A	BOLT
4	4	4	4	AN5-32A	BOLT
32	32	32	32	NAS1149D0463J	WASHER (OR AN960JD416)
8	8	8	8	NAS1149D0563J	WASHER (OR AN960JD516)
24	24	24	24	MS21042L4	NUT (OR MS21042-4)
4	4	4	4	MS21042L5	NUT (OR MS21042-5)

* REFERENCE ONLY. PARTS ARE INCLUDED IN D350-748-141/-143/-241/-243 ASSEMBLIES ABOVE

DQA: _____ Date: _____



WORK ORDER NON-CONFORMANCE / UPDATE

QA Closed: _____ Date: _____

Work Order update only ☐

Work Order: _____ Part No. _____ NCR No. _____	DISPOSITION Rework ☒ Scrap ☐ Use-as-is ☐ Suspected Unapproved ☐	AGAINST DEPARTMENT/PROCESS Skid-tube ☐ Machining ☐ Thermoforming ☐ Large Fab ☐ Cross tube ☒ Small Fab ☐ Finishing ☐ Composite ☐ Water Jet ☐ Prod. Eng. Coord. ☐ Rec/Store/Packaging ☐ Supplier ☐ Engineering ☐ Quality ☐ Other ☐									
Date : <u>16-01-19</u>	Step #: <u>200</u>	QTY Effective : <u>①</u>		MRB (QS1042) Approval DAS 9 9-89 <u>16-01-18</u> Completed By DAS 10 9-89 <u>16-01-19</u> Lead hand / Supervisor Approval Verification DAS 9 9-89 <u>16-01-19</u> QC / QA Coordinator Approval DAS 9 9-89 <u>16-01-19</u>							
Description Work Order Deviation AETC-1032 inserts breaking on installation R.C. equipment, no air regulator on tool		Disposition had on work order to limit air pressure to 50 psi when installing AETC-1032 insert									
Root Cause <table style="width:100%; border: none;"> <tr> <td style="width:50%; border: none;"> Environment ☐ Design ☐ Doc/Data ☐ Equip/Tooling ☒ Handling/Pre ☐ Material ☐ Internal Transport ☐ Tribal Knowledge ☐ LOA ☐ Substation ☐ Past Expiry Date ☐ Misidentified ☐ </td> <td style="width:50%; border: none;"> No Re-verification ☐ Operator ☐ Offset/Setup ☐ Supplier ☐ Training ☐ Use for Testing ☐ Poor Information ☐ Rushing ☐ Product Improvement ☐ Process Improvement ☐ Manufacturing Process ☐ Past Due ☐ </td> </tr> </table>		Environment ☐ Design ☐ Doc/Data ☐ Equip/Tooling ☒ Handling/Pre ☐ Material ☐ Internal Transport ☐ Tribal Knowledge ☐ LOA ☐ Substation ☐ Past Expiry Date ☐ Misidentified ☐	No Re-verification ☐ Operator ☐ Offset/Setup ☐ Supplier ☐ Training ☐ Use for Testing ☐ Poor Information ☐ Rushing ☐ Product Improvement ☐ Process Improvement ☐ Manufacturing Process ☐ Past Due ☐	FAULT CATEGORY <table style="width:100%; border: none;"> <tr> <td style="width:33%; border: none;"> Pressure/Forced ☐ Bending ☐ Centre Not Concentric ☐ Cracks ☐ Crimp/Kink/Ripple/Wave ☐ Cuffs ☐ Crushing ☐ Heat Treat ☐ Wave/Twist in Tube ☐ Marks/Chatter ☐ </td> <td style="width:33%; border: none;"> Temperature/Cure ☐ Set-up ☐ BOM/Route ☐ Broken/Damage/Defect ☒ Inspection Incomplete/Unqualified ☐ Contamination ☐ Countersink ☐ Cut Too Short ☐ Instructions Incomplete/Unclear ☐ Drill Holes ☐ </td> <td style="width:33%; border: none;"> Power Loss/Surge ☐ Folio/Program ☐ Grain ☐ Weld ☐ Wrong Stock Pulled ☐ Out of Sequence ☐ Off-set ☐ Mislabeled ☐ Fit/Function ☐ Misaligned/off center ☐ </td> <td style="width:33%; border: none;"> Positioned Wrong ☐ Outside Dimensions ☐ Over/Under tolerance ☐ Part Incorrect ☐ Part Lost/Missing ☐ Part Moved ☐ Drawing ☐ Finish ☐ Misread ☐ Turning Sequence ☐ </td> </tr> </table>				Pressure/Forced ☐ Bending ☐ Centre Not Concentric ☐ Cracks ☐ Crimp/Kink/Ripple/Wave ☐ Cuffs ☐ Crushing ☐ Heat Treat ☐ Wave/Twist in Tube ☐ Marks/Chatter ☐	Temperature/Cure ☐ Set-up ☐ BOM/Route ☐ Broken/Damage/Defect ☒ Inspection Incomplete/Unqualified ☐ Contamination ☐ Countersink ☐ Cut Too Short ☐ Instructions Incomplete/Unclear ☐ Drill Holes ☐	Power Loss/Surge ☐ Folio/Program ☐ Grain ☐ Weld ☐ Wrong Stock Pulled ☐ Out of Sequence ☐ Off-set ☐ Mislabeled ☐ Fit/Function ☐ Misaligned/off center ☐	Positioned Wrong ☐ Outside Dimensions ☐ Over/Under tolerance ☐ Part Incorrect ☐ Part Lost/Missing ☐ Part Moved ☐ Drawing ☐ Finish ☐ Misread ☐ Turning Sequence ☐
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OTHER : _____											